United Nations
Educational, Scientific and
Cultural Organization

United States
National Commission for
UNESCO

Laura W. Bush Traveling Fellowship Reports

November 4, 2011

Table of Contents

Back to School, Back to Peace: A Culture of Peace in Central America

Michael Aguilar, Summer 2008

Executive Summary

The situation in Central America today is different in each of the countries but all are of vital importance to the United States. Not many years ago, the region was rife with bloody civil wars. Today, the nations of the region have made significant progress on a set of objectives that serves to connect the people to economic and social integration. During the 1990s, Central America went through an enormous process of profound change on the political scene, with democratic governments being set up. However, the political changes were not accompanied to a sufficient extent by parallel economic and social transformations. At the same time, the armed conflicts of the previous decade led to greater backwardness in the region in terms of social development – education, health and life expectancy of its population. This study examines the accomplishments and shortcomings of civil society and government institutions in creating a *Culture of Peace* in Central America.

On August 7, 2008, I ventured to Central America to begin a six week journey that would take me to Nicaragua, Honduras, El Salvador and Guatemala. The purpose of my trip was to explore what a *Culture of Peace* meant to the people of Central America and how its values and attitudes could contribute to peace and conflict resolution. For years, there has been some indication and much speculation that cultural differences can cause conflict. I on the other hand, believe culture can play a constructive role in resolving conflicts by helping to establish sustainable relationships. In order to understand the insufficient knowledge with the intercultural settings in Central America, I relied on the US Embassies in Managua, Tegucigalpa, San Salvador and Guatemala City. They were instrumental in setting up interviews with administrative staff and teachers from public and private schools, officials within the Ministry of Educations, local host families, staff assistants of NGOs, and many others. In addition, the UNESCO Office in New York, particularly Ms. Rochelle Roca Hachem, programme specialist for culture, was very helpful in shaping my preliminary research before flying into Central America.

Each interview I conducted began with two essential questions: What is your identity to your own country? And how would you define a *culture of peace*? The responses to the first question were similar in all four countries. Families expressed frustration but hope for a better tomorrow. Yet it was the response to my second question that shaped my research in Central America in a different direction. Central Americans refused to believe that a *culture of peace* existed with the current nature of the school systems. “If you wish to examine *culture* and *peace*, look at the

schools in the rural villages and you will get your answer," said my first host family in Managua, Nicaragua. And in each city and village I visited, popular dissatisfaction with the social development in Central America revealed challenges with no ready fixes.

Initially, I had planned to meet with religious leaders to discuss how people in different communities resolve disputes and how societies can establish "cultural competence" – in other words, the ability of Central Americans to communicate, make decisions, agree, reconcile, and solve conflicts with a shared understanding. Citizens with the memory of war, defeat, grief, uncertainty, pain, misery, anguish, and so on – have established a cultural identity of denial.

What I had planned to go forward with were exercises to make church leaders help those families create an identity of acceptance. With exercises in each country, the final objective was to come away with recommendations on how to implement a core concept of ethnorelativism. Ethnorelativism assumes the equality of all groups by informing and maintaining tolerance, openness and dialogue, with the ultimate goal of promoting harmony between peoples. However, I was confounded by the opening statement made by the wife of a church leader in my first set of interviews, who said the following:

Imagine a six-year old girl living in rural Nicaragua. She has four brothers and sisters, and her mother is an illiterate widow who earns about $120 per month as a subsistence farmer. What are the chances for that six-year old girl of becoming a prominent lawyer or university professor? Not very high.

I became intrigued by her statement, and asked a number of questions to understand the current shape of the school systems in Central America. It became evident that I would need to meet with school officials and families to hear their side of the story and get their thoughts about a cultural identity of acceptance. For the purpose of this report, I refer to Nicaragua, Honduras, El Salvador and Guatemala as "Central America." They are the worst affected by poverty and thus have the greatest obstacles and need for a *culture of peace*. Information from Costa Rica and Panama are not included, yet many refer to their school systems as the ideal model for the rest of the region. Throughout my six weeks in the region, the care and education of the growing child population became my research. Overall, I learned that it is the greatest social challenge confronted by the governments and societies of Central America.

The central recommendation of this study is for all actors to seek long-term, multifaceted approaches to adequately address the problems of early childhood development, the poor education infrastructure and the brain drain of school leaders. No simple, straightforward solutions exist. For most of Central America's inhabitants, the region's education system have historically inspired distrust, alienation and doubt. In a region characterized by pervasive and untamed inequality of income, and where groups of the population remain excluded from socioeconomic progress, a shift in the debate toward equality of opportunities promises to be a better guide for public policy. Through the work of the UN, NGOs and the United States Embassies, Central America is building on new principles that reveal the imperative stride that is needed for a *Culture of Peace*: "Going back to school."

A Culture of Peace – What is it?

At the eve of a new millennium, a proliferation of regional, local, ethnic, religious and civil conflicts and terrorism around the world emphasize the need for a global transition from a

culture of war to a *culture of peace.* Yet the absence of war does not mean peace. As defined by the United Nations, a *culture of peace* "is a set of values, attitudes, modes of behavior and ways of life that reject violence and prevent conflicts by tackling their root causes to solve problems through dialogue and negotiation among individuals, groups and nations."[1] In order to draw attention to the challenges and issues of the culture of peace, and to encourage international action, the United Nations General Assembly first proclaimed the year 2000 to be *International Year for the Culture of Peace*, in 1997 and subsequently, in 1998 proclaimed the period of 2001-2010 as the *International Decade for a Culture of Peace and Non-Violence for the Children of the World.*

The abundance of knowledge and training that cultural peace specialists have gathered over the years has been slightly ignored. These specialists have attempted to take into account the deep cultures, values, assumptions and fundamental social goals to emphasize a more peaceful community rather than impose methodologies from the outside. Taking those same approaches, I wanted to introduce skills and frameworks to understand the role of culture in conflict and its resolution. By empowering the local leaders with a renewed understanding and appreciation for a *culture of peace*, can Central America take the next step in fulfilling their aspirations for peace and socioeconomic growth.

General Observations

Central America's single most important educational challenge is improving learning at all levels. Improved learning is vital for individual and national growth, competitiveness, quality of life, and the attainment of a *culture of peace*. Today, most children complete their education without gaining sufficient skills to earn a good living. In Nicaragua, Honduras, El Salvador and Guatemala, the Ministries of Education face difficulties in attracting (and retaining) qualified competent teachers to rural areas to improve low efficiency and results among students from poor families. And when qualified teachers are received, all four countries restrict their ability to develop curricula and teaching strategies – they are nationally determined.

A teaching career is not an attractive option in Central America because of low pay, poor working conditions and the low social status of the profession. The *Programa de Promocion de la Reforma Educativa de America Latina y el Caribe* (PREAL) who work for the improvement in quality of education in Latin America and the Caribbean, have revealed startling figures of teacher salaries. In El Salvador, a qualified teacher would make approximately US$ 690 a month; in Guatemala, a primary school teacher earns an average of US$ 560 a month; in Honduras, a primary school teacher starts with a salary of US$ 255 a month; and in Nicaragua, primary school teachers make approximately US$ 100 a month.[2] The troubling truth is that teaching in Central America is at a crisis. Those strong individuals who want to teach will need to make an enormous financial sacrifice to even have a classroom conducive for learning. But this is only the beginning of the hardships that Central America faces.

---

[1] United Nations Resolution A/RES52/13 and A/RES/53/243.

[2] Programa de Promocion de la Reforma Educative de America Latina y el Caribe (PREAL), *Publicaciones*, http://www.preal.org/

Since so many children work to supplement the family income, the school day for most children is considerably shorter than one would expect. Most public schools give families the choice of sending their children to either the morning, afternoon or evening shift to accommodate not only their needs, but the teacher's as well. And because most public schools lack the adequate facilities, only the basic subjects are delivered to students: English, Math, Reading and Writing. Families are put into the difficult position of deciding whether it is cost-effective to send their children to school. A child sent to public school not only means valuable income missed from working in the fields or selling items in the street, but it also constitutes an expected financial contribution to the basic needs for that student: pencils, paper, school lunches and transportation to the school.

Even those fortunate enough to fulfill their secondary education, those bright minds have no plans to study at the university level in Central America. At the conclusion of a survey I conducted with juniors and seniors in private schools, I found that 95% of those planning on going to college were applying to the United States or Canada. The other 4% were applying for schools in Costa Rica, Panama or Europe. Only 1% had the intention of studying at home. There are signs that a "brain drain" might occur in these four countries, because those students who go on to major in engineering, medicine and business will most likely not return to their native country. And those who do gain an education at home only want to be lawyers or politicians. Enrollment figures for secondary schools are cause for serious concern, as the ratio drops enormously for those trying to achieve a high school education. For example, 70% of the children aged 16 and 17 do not have access to secondary education in El Salvador.[3] Similar figures exist in Nicaragua, Honduras and Guatemala. But the one consistent and promising item that I found in my research is that every child I spoke with wants an education.

Nicaragua

Nicaragua's economy is the smallest in Central America, and the consequences of that are alarming to the education system. Nicaragua was my first stop to Central America and my first introduction to the troubling reality of what schools look like in developing countries. The infrastructure of public schools in Managua and Leon (the two towns I visited during my trip) are disturbing. Parents were the first to tell me that it was unfair that their families were responsible for the text books, school paper, printers and pencils, the meals, the custodian supplies, desks and chairs, etc. According to the United Nations Children Fund (UNICEF), 53% of the total population is under the age of 18. Nicaragua's main challenge for the large youth population is to overcome inequity and poverty, which affect children and women most severely.

Many school instructors kept referring to Costa Rica's education curriculum as the model that Nicaragua and all of Central America should adopt. For example, Costa Rica invests more than 28% of its national budget on primary and secondary education.[4] They have also advocated a computer in each school to advance technological innovation in their country. But perhaps the most astonishing figure that no other Central American country can say is that there are more teachers than policemen in Costa Rica. Despite early childhood and education not being given enough priority on the social

---

3 UNICEF, *At A Glance: El Salvador*, http://www.unicef.org/infobycountry/elsalvador.html

4 Escalante, Manuel A., *A History of Education in Costa Rice*, A Paper Submitted for Presentation at the V Congress of the Americas Popular Culture Association Meeting, June 2001.

agenda, there is no real presence of juvenile gangs in Nicaragua. But there were concerns that might change with no progress made in eradicating poverty.

Political tensions were starting to become high, amidst the upcoming November 2008 municipal elections. Teachers and school administrators were concerned that their students might be persuaded to join gangs and student movements if Nicaragua's ruling Sandinist National Liberation Front (FSNL) would disrupt or steal the elections. The FSNL won the 2006 Presidential elections, bringing back Daniel Ortega as president with the promise of his "zero hunger program." In it, Ortega vowed to reduce poverty in rural areas over a five-year period, but according to families I spoke to, there has been no real progress with eradicating the extreme poverty in rural Nicaragua. On the other hand, enormous billboards with the face of Ortega can be seen on almost every block of Managua – a cost believed to be in the thousands per billboard. The frustration of being lied to and living in poverty have made locals destroy those billboards - only to have thousands of more dollars spent on putting up new billboards the next morning. Recently, the November municipal elections in Nicaragua caught the international community's attention with images of the capital city in flames. Those same teachers and school administrators correctly predicted the events, discovering the root causes lying right in front of their eyes: education.

Honduras

I spent the most time of my trip in Honduras, a striking country with its beautiful mountains and attractive people. Yet it is a country that had experienced not one, but two teacher's strikes that were affecting millions of children. According to public school teachers, they had lost all patience with the government when no paychecks had been issued in well over five months. One teacher explained to me that as a whole, societies with greater inequality of basic opportunities among children are more likely to show inequalities later in the lifecycle. As long as those obstacles exist in basic opportunities, children in Honduras will systematically find their chances of success in life much more difficult. Life in rural Honduras is complicated for most families. Nearly two-thirds of the population still lives below the poverty line. And those living up in the mountains have seen no progress from the government in rebuilding schools and roads hit hard by tropical storms and hurricanes, such as Hurricane Mitch from 1998 that is still remembered by most citizens.

One family in particular from a small town called Sigualtepeque, in northern Honduras, left me emotionally distressed for the children in this country. The Maduro family had experienced a life-changing decision of whether or not they should make the dangerous journey from Honduras to the United States to seek better opportunities. The husband decided to go alone and take the "train of death" in Mexico, hoping to make it to the US so he could send money back home. Walking through the town one morning, I noticed the wife working in the field with what appeared to be ten teenagers hired to help her. I approached Ms. Maduro to ask why she hired these young kids to work the fields, when they should be in school. Her response left me in tears – "*Mi esposo se murio el año pasado, tratando de llegar a EE.UU para trabajar y enviarnos*

dinero. Ahora, necesito que mis hijos trabajen para poder sobrevivir." (My husband died last year, trying to make it to the US to send us back money. I now need my children to work with me so we can support ourselves). The ten children in the field were her own, plus two baby daughters watching from the porch of her small farm. This was the common story of families living in rural Honduras.

Upon my departure to El Salvador, I left optimistic that Honduras could find the strength and potential for improving the basic opportunities for children. Two programs in particular caught my attention in the work being done with targeting the youth population. The Cooperative Housing Foundation – now known simply as CHF International – has been a catalyst for achieving long-lasting positive change in low-income communities around the world. In Honduras, CHF International has been working for the past 20 years implementing a wide variety of projects focused on economic and social development. But it was one of their new programs that impressed me: The Youth Engagement for Advancing Hope (YEAH). According to UNICEF, the average number of years of schooling in rural Honduras stands at 4.3 years.[5] This means a large portion of the youth population are unemployed, uneducated and vulnerable to violence or trafficking. CHF International targets those youth by empowering them with activities that provides them education and income so they can remain immune to gangs and trouble.

The other program that left me very impressed with the direction Honduras was taking was its support of the World Food Programme's (WFP) global school feeding campaign. WFP encourages governments throughout the world to put into place national school feeding programs that would nurture a brighter future for children.[6] Honduras was a beneficiary of this program, with the WFP providing school meals in a few towns to help offset the cost of having to feed their children while they go to school. This program has resolved one of the most critical barriers that prevented parents from sending their children to school. With some schools now feeding students as an incentive for their attendance, parents can breathe a sigh of relief knowing that their loved ones will be safe, nurtured and more importantly, given an education.

El Salvador

El Salvador was a culture shock compared to my visits to Nicaragua and Honduras. Unlike most of Nicaragua and Honduras, there were paved roads, skyscrapers, American fast food restaurants, and job opportunities in the capital. It almost felt like being back in the United States, with warm showers and electricity at night. Yet once leaving for the rural towns, reality hit back again. When visiting a school in the Comocaran village (outside of San Miguel), I was shaken by one girl's response when asked about her thoughts of going to school: "Me *siento preocupada cuando voy al escuela. Una de mis amigas fue secuestrada este año, y escondida en un cuarto hasta que el rescate fue pagado. Yo creo que nuestro país sigue en guerra por la violencia que hay aqui* (I am scared for life when I walk to school. Earlier this year, one of my friends was

[5] UNICEF, *Honduras Background*, http://www.unicef.org/infobycountry/honduras_2026.html

[6] World Food Programme, *School Feeding*, http://www.wfp.org/food_aid/school_feeding/index.asp?section=12&sub_section=3

kidnapped and held in a room for a week until the ransom was paid. I really think my country is still at war with all the violence happening around us)." The truth is that in El Salvador, the government done a good job concentrating more on reducing poverty and promoting family stability in the urban cities but done poorly in spending direct expenditures on children's programs in rural villages.

The Instituto Salvadoreño para el Desarrollo Integral de la Niñez y la Adolescencia (ISNA) has taken a proactive approach in addressing youth violence in San Salvador. With the help of the local police, ISNA goes around and picks up students who are unsupervised. They then provide them with psychological counseling on available opportunities besides street violence. But the unfortunate truth is that there is a feature you get from being in El Salvador unlike any other country: that of a *gun culture*. In every commercial area, whether it may be a Pizza Hut or a video game shop, a security guard carrying an automatic weapon is present at all times. Some argue that it is worth having that kind of culture for security purposes and the removal of temptations and corruption. Yet the majority I spoke to believed it is the wrong message to be sending out, particularly to the youth. Children should be made to believe that there are better job opportunities with an education rather than easily becoming a security guard or a member of Armed Forces.

Exposure to gang violence is more prominent in El Salvador than any other country I visited. I was the unfortunate victim of being robbed on a chicken bus by a teenager upon my return to San Salvador. Thanks to the helpful advice of the US Embassy and local families, I was prepared for such an event, but the daily occurrences of such instances are a sad reality for this tiny Central American country. According to UNICEF, 70% of children indicate they have been abused in their home.[7] ISNA reported similar figures, with approximately 1,500 cases of physical mistreatment or abandonment. In no other country did I see such high neglect of children like in El Salvador. Although children beggars were common in Nicaragua and Honduras, it was apparent that children made a living of that in rural El Salvador. I was able to ask one child during a bus ride in El Mozote why children are forced to beg, to which he replied: "*No hay dinero y no tengo nada que hacer"* (There is no money at home and I have nothing better to do). The people of El Salvador are perhaps the hardest working of anyone else, but such rewards have come with a price – the neglect of children and students.

Guatemala

Guatemala is a unique case study with its indigenous population having maintained a distinct identity. Although I only spent a couple days in this country rich with culture and history, several families in the western highlands have told me that the government at times has tried to suppress the indigenous culture, hoping to make Spanish the universal language. This also translates into the school systems, where the Mayan languages are slowly becoming extinct. Overall, the Guatemalan

---

7 UNICEF, *At A Glance: El Salvador*, http://www.unicef.org/infobycountry/elsalvador.html.

education system is characterized as poor quality with urban concentration of resources. According to my host family in Guatemala City, 70% of Mayan women cannot read or write. According to the United States Agency for International Development (USAID), fewer than 30% of students in the region complete secondary school, and many of those who do finish lack the skills to compete in the workplace. Guatemala has been known to have the lowest human development indicators in the Latin America and Caribbean region. The poor, particularly girls and rural indigenous children of both genders, have less access to basic education. And those indigenous children who do go to school have teachers that neither understand nor speak the children's maternal languages.

Yet each country had at least one bright story, and for Guatemala it was Camino Seguro (Safe Passage). The highlight of my trip in Guatemala was my visit to one of the programs the First Lady Laura Bush participated in during her Latin America trip in March 2007. Safe Passage is a project that offers hope and educational opportunities for the poorest families living in Guatemala City. Safe Passage today has grown from educating 40 children to over 500. The slums of Guatemala City have been known to make youths vulnerable in joining the drug trafficking entering Mexico. But Safe Passage has provided families hope that their children can at least have an education and better health care rather than rely on drugs.

Most people I spoke to in Guatemala City remember the First Lady's visit in 2007 and applaud her work with children and education. They appreciate the work done by women leaders such as Mrs. Bush and Wendy Widmann de Berger, wife of Guatemalan President Oscar Berger Perdomo. One such example is the program is Widmann de Berger's work with *Creciendo Bien*. It focuses on educating women and enabling them with the proper tools to survive and be active members of society. Having strong women leaders promote and raise awareness with such needed programs have made Guatemala push stronger for institutional support for children's rights. The next step for Guatemala is to assist rural areas and indigenous populations with teaching them the values and attitudes needed to rebuild their society.

Concluding Thoughts

An ethnocentric orientation of culture in Central America has long existed since the outbreak of civil war. At certain times, Nicaragua, Honduras, El Salvador and Guatemala have attempted to avoid cultural diversity by denying the existence of differences, or by using defenses against difference, or even by minimizing the importance of difference. This in turn has led to the current state of the education system. What is needed more than ever from all relevant players (parents, teachers, school

administrators, Ministry of Education officials, and most importantly, the student) – is the understanding of how to apply the ethnorelative perspective in their everyday activities. Acceptance is the key for a *culture of peace* and in order for education to be turned into a genuine instrument of economic and social development, the children of Central America will need to learn how to get along with their classmates and neighbors.

The situation in Central America has led to an increase awareness of the importance of implementing profound changes in social development, notably the need to establish long-term strategies for early childhood development, educational infrastructure and further incentives and resources for school leaders. Over the years, education has become incrementally more accessible in Nicaragua, Honduras, El Salvador and Guatemala. But cultural and economic gaps exist. Children often see no hope for peace due to their surrounding features: poverty, drugs, corruption, and malnutrition. Yet all community, church and political leaders agree that any long-term planning must begin with the youth. Parents have every right to be frustrated with their living conditions and outlook for their children. Nevertheless, the desire to do more and better can be seen in every child's heart. They want what we have here in the United States and are determined to get it - opportunity.

The six weeks spent with students of all ages was without a doubt the most rewarding experience ever. I was able to be a teacher on several occasions, eager to hear me speak on topics such as the UN, U.S. foreign policy, US culture and entertainment, etc. Standing in front of a class of 40 is no easy task, but their enthusiasm to learn made me realize that education is a treasure for most of these children. At the end of the day, we all learned so much from each other. The students of Central America were able to learn something about life in the United States while I learned something about life in Central America. But for the purpose of my study, the best advice I received during my travels came from a young girl from the Escuela Internacional Sampedrana in San Pedro Sula, Honduras. I asked her my usual question: "How would you define a *culture of peace*?" Her response was the million-dollar answer I was looking for: "You send every child back to school and that means you bring everyone back to peace." She is absolutely right – back to school, back to peace.

The Conflict Mitigation Potential of Water Users' Associations in Southern Kyrgyzstan

Heather Larue McGee, Fall/Winter 2008

Project Summary

The overall objective of my research was to determine the impact of inter-communal water organizations on ethnic relations and conflict over irrigation water through a study of Water User's Associations in southern Kyrgyzstan. I implemented my research project in Batken Kyrgyzstan from November 2008 through January 2009.

Project Activities:

I implemented a survey project that was administered to 350 individuals throughout Batken oblast. In particular, during my Fall/Winter field research, I created four survey instruments to collect data on ethnic relations, trust, conflict levels, individual assessments of WUA effectiveness, overall community relations, etc. Three survey instruments were designed for three population groups that I deemed important (1) local governmental leadership (2) village elders (aksakals) and (3) local villagers. I contracted out The Foundation for Tolerance International, a local and well-recognized NGO, to help conduct interviews, focus groups and individual surveys. Judgment and convenience sampling methods were used to survey individuals located in the middle and tail ends of irrigation systems in the 12 villages chosen for my study. These non-probability sampling methods were necessary due to financial considerations. The use of a local NGO has enabled the collection of better data and promoted the development of relationships of trust between interviewers and respondents. In Central Asia, such a relationship is essential for obtaining information on taboo issues such as conflict and ethnic relations.

During my winter field research, I implemented a focus group and interview project throughout southern Kyrgyzstan. Semi-structured interviews were completed with 22 community leaders, directors and staff of WUAs and representatives of NGOs, IOs and local and national government agencies. Eleven focus groups were held throughout villages in Batken to discuss the functioning of WUAs, informal water management and ethnic relations in the villages. These methods represent a highly effective and appropriate method for researching topics related to conflict in a field setting and provide a means for uncovering how rural populations conceptualize their ethnicity in the context of water scarcity.

Participation in public diplomacy:

During my research, I worked closely with the Foundation for Tolerance International, a leading Kyrgyz NGO, which was contracted out to help me with my survey project, focus groups and interviews. I visited villages throughout southern Kyrgyzstan and was able to interact with

hundreds of Kyrgyz throughout my project. After my analysis and data collection is complete in February 2010, I will be able to focus on writing up my results in the form of policy reports and journal articles and I will begin presenting my research results at academic conferences. Also, my final research report will be submitted to Winrock International, USAID, and the World Bank, which could lead to opportunities for me to present my results to the international policy and development community.

Assessment of original goals:

Research Limitations:

The politically sensitive nature of ethnicity research in Kyrgyzstan has lead to some unfortunate results for students and researchers. This has especially impacted American researchers and volunteers. During my research, one student of the Uzbek language was deported for alleged "spy" activity and a Ph.D. student on a Fulbright scholarship was blacklisted from Kyrgyzstan as a result of his research on trust relations between Uzbeks and Kyrgyz in Osh. Four other American researchers received warnings from the American embassy regarding their activity in Kyrgyzstan and Peace Corps volunteers have received warnings that their apartments and phones are "most likely bugged" and therefore, to refrain from discussing politically sensitive topics including ethnicity.

Obviously, these developments impacted my research. During my research, I toned down the "ethnic" component of my research and I focused on the analysis of cooperative arrangements for managing irrigation water conflicts and resources. This has been especially evident in the removal of some questions regarding ethnicity in some circumstances. I also established institutional ties with a local NGO- the Foundation for Tolerance International (FTI) in order to complete the ethnic portion of my research. During my fall/winter research, I contracted out their services for my focus group activities and analyzed ethnic relations, largely form the position of a "volunteer" for FTI. Also, I relied on my interpreter in many situations to advise me on asking certain sensitive questions. As a result of the research limitations outlined above, I was not able to collect a large amount of detailed information on how WUAs are impacting ethnic tensions over water.

However, I was able to collect good data on broader issues of conflict, and I was able to collect archival data on meetings between ethnically diverse villages engaged in conflict over water resources. This archival data represents a wealth of significant and unexplored data on a United Nations project in southern Kyrgyzstan that was dedicated to conflict mitigation among villages. I am currently waiting on translations for many of the meeting "minutes" from Kyrgyz to Russian so I can complete my analysis. These results will be submitted to the National Commission upon completion in the next several months.

Initial Results[1]

First, my research seems to indicate that there is no fundamental difference between ethnic groups over irrigation water. Specifically, there are disputes, tension and conflict in both ethnically heterogeneous and homogenous villages. There does seem to be a difference in the intensity of the conflict depending on whether it is an intra-ethnic or intern-ethnic conflict, where the intern-ethnic conflicts are more intense. The fundamental problems are occurring in the border areas between Kyrgyzstan and Uzbekistan and Tajikistan. This represents the primary source of inter-ethnic conflict over water issues but his is inherently an "inter-state" conflict and therefore there are many more factors for analysis than just the ethnicity variable.

Second, Water Users Associations that are supported by the Winrock International Water User Support Program seem to be better able to manage and mitigate general conflict situations over irrigation water among members and villagers. The Winrock program utilizes bottom-up methods and social mobilization tools to train and develop the Water Users Associations. These methods promote communication, awareness and knowledge among villagers which helps to mitigate potential conflict situations.

As mentioned above, I am still in the process of translating many of the archival materials that were collected during my winter field research. I will continue to write-up my results over the next academic year. I will use the results of this winter research to focus my future research questions and data collection efforts.

Future Research:

The Laura W. Bush Traveling Fellowship provided fundamental support for important exploratory research in Southern Kyrgyzstan. My survey and interview project in Batken, Kyrgyzstan allowed me to collect important contextual and qualitative data which provided me with a deeper understanding of the issues surrounding irrigation water management in Kyrgyzstan. Due to the research completed with the Laura W. Bush Fellowship, I was able to secure additional funding from the U.S. Agency for International Development in order to complete a more sophisticated and widespread research design across the Osh, Batken and Jalalabad oblasts of Southern Kyrgyzstan. In particular, my future research represents a program evaluation of USAID's largest international development project in Central Asia which is dedicated to building the capacity of WUAs in southern Kyrgyzstan.

Promoting Democracy and Strong Ties:

My final report will be shared with the World Bank, U.S. Agency for International Development and Winrock International. In particular, each of these organizations currently plays a key role in

[1]Please refer to the "Research Overview"

either the development of Water User's Associations or conflict mitigation regarding water in Southern Kyrgyzstan. My research will provide the most robust analysis of water conflict in Southern Kyrgyzstan and that this information will prove highly valuable to the development of policies aimed at Water User's Associations and how to best implement these organizations to minimize conflict and promote the most efficient management of scarce water resources.

Research Overview & Analysis

Introduction:

Across the developing world, conflicts over irrigation water are pervasive within and across villages and between farmers. (Lundqvist and Gleick 1997; McKinney, 2008)Over one-third of the world's population lives in countries experiencing high water stress; by 2025, this percentage is expected to rise to two-thirds. Almost two and a half billion people depend on irrigated agriculture for food, income and employment (McKinney 2008; OSCE 2006) Thus, improvements in the governance of existing irrigation schemes are intimately tied to issues of food security and the needed expansion in world food production. (ICG: Central Asia: Water and Conflict; GTZ Report 2004; Clemmens 2005).

In many areas, increased water quantity and quality concerns are primarily driven by poor or inadequate management and inefficient usage and distribution. Water Users' Associations are implemented to ameliorate water shortage concerns, reduce water use conflicts and halt the deterioration of irrigation systems. They are seen as central to the growth and viability of the irrigated agricultural sector in developing countries. My research investigates Water Users' Associations (WUAs) in southern Kyrgyzstan, specifically, the role of these democratic and local associations in improving irrigation water management and negotiating cooperation among farmers as they compete for use and control of irrigation systems.

The assumption in the policy discourse and academic scholarship on irrigation reform is that the establishment of WUAs will necessarily lead to efficient and equitable irrigation management. (Sehring 2006) However, there is considerable variation in the effectiveness of WUAs. Research has shown that most WUAs are failing to achieve their fundamental mandate of providing adequate, timely and equitable water supplies to all water users within a command area. (Sehring 2008; Carlos Garces-Restrepo, Douglas Vermillion and Giovanni Munoz 2007).

My dissertation study has three main objectives. First, the project seeks to explain variation I the effectiveness of WUAs by undertaking the first rigorous program evaluation of a WUA Support Program in Central Asia. Research indicates that variation in WUA success can be explained, in part, by the various methods and procedures for implementing them. For example, the majority of WUAs have been implemented in a top-down procedure that focuses on reinforcing the physical capacity of the irrigation system through infrastructure and technical rehabilitation. Alternatively, WUAs have been established by bottom-up techniques which emphasize the

mobilization of human capital within local communities through training and educational programs. An impact assessment will provide concrete evidence on which of these methods is the most effective for fostering successful irrigation management among rural populations.

Second, the study also seeks to advance our understanding of the factors and conditions that facilitate or hinder collective action in irrigation management. Much theoretical and empirical ambiguity surrounds several key variables, which, it is argued, either facilitate or hinder collective action in natural resource management. For example, there is little agreement as to the impact of external actors, such as NGOs, in building capacity at grassroots levels for the community management of common pool resources. (Agrawal 2002; Poteete and Ostrom 2004; McCarthy, Dutilly-Diane and Drabo 2004; Ruttan 2006, 2008). Further, while some researchers have posited that ethnic and socio-cultural heterogeneity reduces cooperative capacity and social cohesion (Bardhan and Dayton-Johnson 2002; Ruttan 2006, 2008) other research has suggested otherwise. (Poteete and Ostrom 2004) Finally, there is also a lack of scholarship on the mechanisms by which "social capital" affects social cohesion and cooperative capacity (Wagner and Fernandex-Gimenez 2008; Krishna 2004; Quibria 2003) My research will resolve these ambiguities by isolating and exploring the effects of the aforementioned variables.

Third, my study investigates the extent to which, and under what conditions, the networks and associational links that WUAs create among water users represent an opportunity and strategy for conflict prevention in locations with a history of ethnic tension over irrigation water. In the past decade, research has focused on the importance of encouraging group alignments along divisions other than ethnicity for mitigating ethnic conflict. (Varshney 2002) There is a division between scholars of ethnic conflict on whether the creation of formal associational links and increased inter-communal contact will ultimately reduce the incidence of ethnic conflict. Those who argue that networks of engagement increase communal peace content that here are several mechanisms that link civic networks to ethnic peace. First, civic engagement leads to enhanced communication between members of different communities, which promotes inter-communal understanding and conflict resolution through dialogue. Also, these relationships provide a pre-made mold or framework for the formation of temporary organizations in the times of inter-group crisis or tension. (Deutsch 1966; Varshney 2002; Horowitz 2001) On the other hand, there is empirical evidence and theoretical support for the claim that increased interactions can bread resentment and violence. In particular, contact may promote the recognition and subsequent hardening of ascriptive differences and group boundaries. The results could be greater conflict over economic, environmental, and political resources. (Barth 1964; Connor 1972) My study of WUAs addresses this important debate over the power of associational ties to mitigate ethno-nationalist violence.

The study represents a program evaluation of an international development project dedicated to building the capacity of WUAs in southern Kyrgyzstan. Two primary research designs will be used for the program evaluation. The two designs include an interrupted time series with

nonequivalent comparison group design and a survey post-test design with nonequivalent comparison groups. Two forms of data will be collected over a six week period. First, a multi-stage large N survey research project will be implemented that utilizes random sampling methods. Second, economic/budget data will be gathered from the WUAs under study and from the World Bank On-Farm Irrigation Water Users' Association Support Program.

Background: Kyrgyzstan, Water Users' Associations and Collective Action

Some of the largest irrigation schemes in the world are located in the Central Asian countries of Kyrgyzstan, Kazakhstan, Tajikistan, Turkmenistan and Uzbekistan. Localized violent clashes over irrigation water are pervasive throughout Southern Kyrgyzstan, which comprises a part of the Ferghana Valley – one of the most fertile, ethnically diverse and densely populated areas in Central Asia. Southern Kyrgyzstan was chosen as the site of my research study due to the presence of Water Users' Associations as well as the especially crucial role that irrigation water concerns play in the ethnic tensions and political stability of the country.

Agriculture is of vital importance for Kyrgyzstan. Despite the fact that over 66% of the population lives in rural areas and is dependent on agriculture for their livelihood, less than 7% of Kyrgyzstan's territory is suitable for agriculture. Thus, arable land is crucial to the survival of the country's population. Due to the arid climate, over 90% of the country's water use is dedicated to irrigated agriculture. In the Osh, Batken and Jalalabad provinces, water shortages arise during the summer irrigation season due to the degradation of irrigation infrastructure and poor resource management. These deficiencies provoke disputes and violence between farmers and villages. (ADB 2004; OSCE 2006; Sehring 2008)

And yet while the arid climate is partially responsible for water shortages, of greater concern is the inefficient use of the water resources available. Since the collapse of the Soviet Union, Kyrgyzstan's budget crisis has led to a dramatic weakening in water management institutions and a serious decline in infrastructure and canal maintenance. This has resulted in the deterioration of irrigation and drainage systems, which has led to increasingly inefficient irrigation and high levels of water loss. In many areas, water supply is erratic and the land has become un-arable due to damaged canals and broken water sluice gates. (OSCE 2006; Sallaku, Kristo and Burton 2003; ICA 2003)

Thus, in order to reduce the financial burden of irrigation governance on the national budget, Kyrgyzstan embarked on an irrigation sector reform in 1999. This process, known as Irrigation Management Transfer (IMT), entailed the complete devolution and transfer of management, maintenance, and irrigation investment tasks from government/public institutions to private community-based farmers' organizations – in the form of Water Users Associations. Four hundred and sixty two WUAs have been created throughout Kyrgyzstan.

In order to ameliorate water scarcity, and thereby reduce conflict over irrigation water, WUAs must overcome the collective action or social dilemmas that are inherent in common pool resource management. Collective action can simply be defined as "action taken by a group

(either directly or on its behalf through and organization) in pursuit of members' perceived shared interests" (Marshall 1998). In the context of irrigation systems, farmers participate in collective action by following the dictates of their respective WUAs; paying irrigation service fees, not violating irrigation schedules, taking care of irrigation infrastructure and contributing to maintenance. When farmers fail to adhere to these guidelines but continue to draw benefits from their membership in the respective organization (WUAs), a classic "collective action" problem or "social trap" arises. Each individual farmer's rational pursuit of "water-maximizing" behavior will eventually result in the overuse of the irrigation system and depletion of irrigation water, to the detriment of the collective.

Water Users' Associations are constructed to promote successful collective action outcomes. They are formal institutions that are supported by a legal system and legal statutes and are designed with a set of rules, concrete organizational structure, and specific procedures that are aimed at constraining and shaping human interactions or behavior. WUAs provide a coordination mechanism or "structured bargaining forum" which enables individuals to more efficiently and effectively organize their actions for the successful governance of irrigation systems. The presence of WUAs is argued to reduce the large transaction costs and uncertainty that occur when there is decentralized coordination of an activity among a group of individuals, thus promoting consistency of water user behavior and reducing the uncertainty of outcomes of exchange. (Subramanian, Jagannathan, Meizen-Dick p.19) (Yakubov and Ul Hassan 2007; White and Runge 1994)

According to the program theory behind Irrigation Management Transfer, WUAs create a sense of ownership among water users within an irrigation system because of participatory and transparent decision making and the mandatory irrigation service fee requirement. The obligations of WUA Members include the payment of WUA fees, which include the Irrigation Service Fee (ISF) for the supply of water to the WUA from the local water authority. Members are also responsible for caring for the equipment used or owned by the WUA and paying for the costs of repair or replacement for any equipment that might have been damaged as a result of international action *or* neglectful non-action. Since farmers must pay for their supply of water and cover the cost of system repairs, the claim is that they will be more likely to play an active role in the management of the system and monitoring of the condition of irrigation infrastructure. Moreover, farmers will be less likely to damage the irrigation structures and will want to acquire more information about water distribution and irrigation management. (Sehring 2008, XXX)

Furthermore, the upstream farmers' need for labor and money to purchase water provides downstream farmers with a bargaining lever and promotes dependence between downstream and upstream farmers. Tail-ender farmers who do not receive water, or receive an insignificant amount, will refuse to contribute. Therefore, head-end farmers will refrain from violating watering schedules or taking more than their allocated amount to ensure that the downstream farmers receive their share. (Interview with John Baxter)

Nevertheless, empirical results indicate that most WUAs in Kyrgyzstan are failing to ensure efficient and fair water distribution and usage. They have had limited success collecting Irrigation Service Fees (ISF) and they have not been able to halt the deterioration of irrigation systems. Water theft is widespread thereby perpetuating conflict among water users. (Sehring 2008: 33, 51, 130-134)

SECTION I: Why do WUAs fail? Solving Collective Action Dilemmas in Irrigation Management

The dominant view among policy makers is that irrigation is a technical system that can be improved through rational decision making and implementation by engineering experts. In most cases, attention to local contexts and cultural norms of behavior are notably absent. Accordingly, scholars have claimed that WUAs are failing because they have been established in a top-down manner which disregards social mobilization and education components. (Sehring 2006; Aimbaeva 2004) When a cooperative arrangement is established in a top-down fashion, there is a higher probability that the benefits of cooperation and the impact of individual actions on natural resources will be misunderstood. Individual rationality dictates that an irrigator will most likely only voluntarily join in a cooperative arrangement if it is perceived to be profitable or beneficial over time. Alternatively, the assertion is that the WUAs should pursue bottom-up implementation methods, such as educational trainings, social mobilization and information campaign, which will help to achieve a critical mass of cooperators, and to ensure that the benefits of cooperation and participation are well understood. (Baland and Platteau 1994; Seabright 1994)

These are claims worth taking seriously. In order to investigate the impact of bottom-up techniques, I am undertaking an impact assessment of the Winrock International Water User Support Program (WUASP) in southern Kyrgyzstan. Winrock International is an American non-governmental organization that seeks to improve the effectiveness of WUAs in Central Asia through the use of bottom-up capacity building methods that emphasize social versus physical/infrastructure investments. Winrock works with 24 of the 185 WUAs in Southern Kyrgyzstan, dedicating between 3 and 6 months to a "community mobilization process" for each of the WUAs in the program. The programmatic methods employed include extensive trainings, awareness campaigns and educational programs for all members of a WUA.

In particular, a "Winrock community mobilizer" seeks to build relations and trust with the local community, which requires that the mobilizer live or spend extended periods of time in a village. A mobilize will, in some cases, go door-to-door, visiting every farmer in a community and hold discussions about (1) the substance and goals of WUAs (2) the Kyrgyz Law on WUAs (3) specific water problems faced by the community and (4) improving irrigation management. After working at the individual level, the mobilizer organizes groups of the most "active" farmers for

further training. After these groups are sufficiently trained, they are instructed to continue the education and awareness program.

In comparison, other top-down organizations' trainings and seminars for the institutional development of a WUA vary from one day to two weeks, and are focused on the leadership of the WUA. For example, according to an interview, "The World Bank is really heavy on construction and not institutional development…The government wants the heavy infrastructure because they want something on the ground, and because there is already so much corruption. They put up the money and you have to spend the money in a certain amount of time. If you don't move money, and you are the manager of a project, then you look bad."(L. Winrock. June 7, 2008) Winrock also implements "cement and stone" infrastructure/rehabilitation work. However, whereas Winrock spends approximately 86,000 USD on each WUA for rehabilitation, the World Bank spends approximately 630,000 USD.

Essentially, Winrock works to build or strengthen social and human capital in the project WUAs. Broadly defined, social capital represents human relations that are characterized by relationships of trust, norms of reciprocity, and networks among a well-defined social group which can be mobilized for achieving individual or collective benefits (Krishna). The claim is that social capital is a means for overcoming opportunism and the moral hazard that are inherent in interpersonal relationships. Scholars argue that social capital facilitates collective action by enhancing reciprocity, individual reputations and trust. (Quibria 2003; Ostrom Workshop) Trust and social cohesion minimize transaction costs and help to reduce the free-rider problem. Groups with a higher degree of social capital can use it to acquire other resources, including financial and human capital. (Wagner, Fernandex-Gimenez 2008; Krishna 2004; Quibria 2003)

In Kyrgyzstan, social capital becomes especially important because WUAs do not have the technical and financial capacity to monitor water theft and enforce sanctions for rule violations. (Sehring 2003; Ul Hassan, Starkloff and Nizamedinkhodjaeva 2004) My survey of the 2006 and 2007 yearly reports from the World Bank's On-Farm Irrigation Support Program indicates that there have been no documented fines or sanctions undertaken in any WUA in Kyrgyzstan. These institutional weaknesses diminish water users' incentives to cooperate and coordinate in the management of water resources. (Lansing, 2006; Subramanian, Jagannathan, Meinzen-Dick) Non-cooperative behavior becomes rational because water users cannot rely on the irrigation system to be equitable and efficient. (Ul Hassan, Starkloff and Nizamedinkhodjaeva 2004: 21)

My research results provide preliminary evidence that, in contrast to most WUAS in southern Kyrgyzstan, WUAs involved in the Winrock WUASP have significant and steadily increasing Irrigation Service Fee (ISF) collection rates, which represents the primary success measure for WUAs. The directors and councilmen in all 13 Winrock WUAs that I interviewed noted an increase in the collection rates. "Before the implementation of the program, the mirabs (water gate managers) had to visit each farmer to try and collect the fees but now they bring the money here and it is the middle of the year and we already have the money here and it is the middle of

the year and we already have about a 50% collection rate. Last year we had a total collection rate of 50%." (L. Akbulak-Dikan WUA, Kyzlir Batken, July 8th 2008)

Consequently, I argue that the programmatic methods employed by Winrock are necessary for achieving successful WUAs in the cultural context of rural communities in Central Asia. Social capital may compensate for financial and technical capacity in poor rural communities which lack formal monitoring measures and punishment regimes. Moreover, the discussions and group meetings represent means for conveying important information about irrigation water management to rural populations. Greater information and awareness represents the fundamental step towards launching successful cooperation and reducing violence. (Baland and Platteau 1994) Many whom I interviewed confirmed this conclusion: "We had bad fights over water in the past, even the police were involved… Now, it is better because we teach people that it is beneficial to regulate water for all. People are better aware of the situation. Before the trainings, people didn't understand what the WUA was…trainings were held on water management and they learned that too much water leads to a decrease in crops and they learned how to distribute the water. They constructed water sluice gates because with them, it makes scheduling the water easier. Before, they (the farmers) manually regulated the water, now, they use sluice gates. People would destroy the home-made devices. Now, water delivery has improved for end users and their yields have improved." (L. Tamchi-Bulak WUA, July 22, 2008) "Even though water level is low, the disputes are less and less every year. Though they are not happy with low water, they have more information so people understand." (L. Shaidan WUA, Jalalabad. August 4, 2008)

In addition to studying the efficacy of Winrock's bottom-up methods, this study will also attempt to determine the importance of several key variables in the success or failure of irrigation management. First the study will examine the role of external actors in general. External actors can build the capacity for community management of irrigation water through physical, education and institutional assistance. On the other hand, the support provide by these organizations can increase the asymmetry of interests and endowments among community members, crowd out informal networks, and replace local efforts. (Gebremedhin, Pender and Tesfay 2004) Also, in the post-Soviet Central Asian context, there is a genuine threat that external involvement will perpetuate the culture of dependency. The study provides an excellent opportunity to analyze how external organizations can build or hinder capacity at grassroots levels.

Second, my research study will enable an investigation of the effect of ethnic heterogeneity on cooperative capacity. Socio-cultural heterogeneity is often posited to reduce cooperative capacity and social cohesion (Ruttan, 2006, Bardhan and Dayton-Johnson 2002), but does it really lead to poorer collective action outcomes? The argument is that heterogeneity can lead to variance in the incentive structure and distribution of costs and benefits for collective action. Heterogeneity can promote competition instead of collaboration due to differences in interests and distributional results regarding various solutions. (McCarthy, Dutilly-Diane and Drabo 2004)

Nevertheless, some scholars claim that heterogeneity may increase network capacity by raising the amount and diversity of contributions and skill-sets made to certain public goods (Poteete and Ostrom 2004; Ruttan 2008).

SECTION II: INTERCOMMUNAL WUAs & ETHNIC RELATIONS

Just as ethnic heterogeneity may increase or reduce cooperative capacity, it may also increase or reduce tension and violence. An ethnic dimension has characterized past major outbreaks of conflict over water in Southern Kyrgyzstan. In 1990, the Osh riots or "Uzgen events" involved large scale ethnic violence between Kyrgyz and Uzbeks over land and water issues. The casualty figures range from the hundreds for official sources to the thousands among un-official sources. Furthermore, since the 1930s, conflicts between Kyrgyz and Tajik villages over land and water have been occurring around the Vorukh enclave of Tajikistan, located in southern Kyrgyzstan. Following an outbreak of violence in 1975, the Soviets brought in the army and enforced a land and water sharing agreement between Tajiks and Kyrgyz. At the end of 1989, violence erupted yet again between Kyrgyz and Tajiks, an outbreak called the "Ketmen War." (AUCA April 2008)

Smaller more localized conflicts over the availability and/or allocation of water are becoming more frequent and widespread in ethnically homogenous and heterogeneous communities throughout southern Kyrgyzstan. Disputes regularly occur throughout the summer irrigation period between Kyrgyz, Tajik and Uzbek villages and between water users within the same village. Tension over water resources in the Ferghana Valley has arisen from disagreements over *who* should access the water, as well as how to handle the large variation in *when* and *where* water is available. (OSCE 2006; Luigi de Martino and Novikov 2005; ICG: Central Asia: Water and Conflict; GTZ Report 2004)

Resource scarcity and competition over natural resources is often described as a factor that exacerbates ethnic tensions. The claim is that ethnic identity can play a powerful role in the emergence and build-up of tensions over limited environmental resources because personal ties based on ethnic identities serve to direct scarce goods to members of one's own group. Consequently, when a collective resource is overexploited or degraded by one "ethnically distinct" community or country at the expense of another, conflict can arise over the use of shared resources. (Homer-Dixon and Valerie Percival 1996) Indeed, evidence from several case studies on common pool resources suggests that less conflict and more cooperative agreements are found in ethnically homogenous areas. (Ostrom, and Stern 2003; Taylor and Singleton 1993)

Moreover, the control of resources is argued to be a manifestation of power structures, whereby access to water is closely linked to political enfranchisement. Thus, an individual or group's status in society is reflected in their water usage and advocacy of demand-side water management techniques. The control of a vital resource endows a group with political and economic power and is likely to be contentious. Accordingly, a lack of control/ownership of

water is indicative of social exclusion and lower status. (Strang 2004)

In contrast, the work of some scholars has provided theoretical and empirical evidence that, at least partially, refutes the ideas and suggests a less pessimistic account of the relationship between ethnicity, conflict and natural resources. To begin with, a direct causal link between scarce resources and conflict has not been found. Large-n data analysis has failed to uncover the specific mechanisms that explain the role of natural resources in outbreaks of violence. (Ross 2004a; Ross 2004; Fearon and Laitin 2003; Collier and Hoeffler 1998, 2004)

Further, despite two decades of political and economic turmoil, continuing border ambiguity, mass population migration, and a deteriorating natural resource base, there have been no major outbreaks of ethnic violence in the Ferghana Valley. In the majority of multi-ethnic communities throughout Southern Kyrgyzstan, Kyrgyz, Uzbeks and Tajiks have maintained peaceful relations and cooperative arrangements.

Some scholars argue that shared water resources represent an opportunity for cooperation and "path to dialogue" in the midst of conflict. Anthropologists have argued that the "moral economy of water" impels people to interact and coexist in an extraordinary manner when the essential resource held in common is scarce. (Trawick 2001) An endangered environment and resource scarcity can provide an impetus for coalition across ethnic boundaries. (Peters 1992) As groups work together to create sustainable water management organizations, the lack of water could promote increased dialogue and new forms of identifications that cut across ethnic divisions. Water-sharing agreements have been successfully incorporated in the development schemes of politically unstable regions as a mechanism for building relationships between groups in conflict. Institutional frameworks designed to foster cooperation over shared water resources have proven to be enduring agreements. (Gleick 1993, 1998; Wolf 2002)

Thus it can be seen that resource scarcity in multi-ethnic regions does not inevitably lead to violence and instead can represent an opportunity for peace. Therefore, if peace is possible, the question becomes: can inter-communal resource management organizations such as WUAs help achieve it? WUAs are designed to bring water users together for democratic decision making, increase dialogue and improved dispute resolution in cases where conflict arises over the distribution of water. The rules, procedures and institutional structure of WUAs create formal associational links which are intended to increase contact among potentially competing individuals and groups. The initial participation of farmers in decisions that have a large impact on them is argued to diminish the number of potential water disputes.

Because dispute resolution involves high transaction costs, WUAs are supposed to provide farmers with a platform and procedures for resolving tensions that are accessible and affordable. Thus, WUAs are legally required to institute a "dispute resolution" committee to promote conflict resolution and foster understanding and trust between competing individuals and groups. (Kyrgyz Water Law 2001) However, reports have documented the inability of WUAs to resolve conflict and have highlighted their lack of legitimacy for deciding disputes. Recognized and

entrenched conflict resolution mechanisms are often absent in WUAs; survey research has shown that farmers do not perceive WUAs as legitimate organizations for resolving water conflicts. There are many cases where dispute resolution committees only exist on paper. (Sehring 2003; Ul Hassan, Starkloff and Nizamedinkhodjaeva 2004)

My research provides evidence that many Winrock WUAs, by contrast, have been able to map successful local dispute resolution mechanisms onto their institutional framework. I contend that an increased awareness of rules and procedures generated by the community mobilization programs results in a higher level of participation in the WUA by water users. Increased participation leads to a better understanding of the purpose of the "dispute resolution committee" and gives people an opportunity to elect village elders (aksakals) to the committee. In the villages of southern Kyrgyzstan, aksakals hold legitimate dispute resolution power. Thus, in cases where the aksakals comprise the "dispute resolution committee" of the WUA, the WUAs have a greater degree of legitimacy. "In the past, there were lots of fights. There were disputes and fights between users and mirabs etc. (Laughing) Now if there is a dispute; the mirabs are the first level, then the council, then the dispute resolution committee. The dispute resolution committee is the aksakals." (L: Uchkorgon WUA. Kadamajai Batken, July 8th – July 9th, 2008)

My hope with this dissertation is to determine the impact of inter-communal water organizations on ethnic relations. The organizational structure of WUAs encourages multi-ethnic public participation for the governance of scarce water resources. Ultimately, I hope to conclude whether these multi-ethnic organizations dedicated to improving local water resource management in the Fergana Valley have been successful in fostering water cooperation among diverse and feuding ethnic groups.

CONCLUSION

The implications of my research extend far beyond southern Kyrgyzstan. First, the essential nature of water supports the cross cultural comparison and generalizability of my research findings. The beliefs, values, and concerns expressed by the individuals and communities of southern Kyrgyzstan will likely be shared by those in similar situations elsewhere. For example, water scarcity concerns are evident across the Middle East, Africa, and South-East Asia. WUAs have been implemented across these regions to reduce conflict and enhance cooperation through improved water resource management.

This dissertation will advance our understanding of the factors and conditions necessary for promoting successful collective action outcomes and offer policy recommendations on how to structure and construct effective water management projects that encourage best practices for irrigation management in developing and multi-ethnic societies. The dissertation will investigate and assess the variables that facilitate or hinder collective action in irrigation management and will provide policy recommendations on how to design and establish WUAs in order to increase water-use efficiency and equitable distribution.

Second, this study will advance the scholarship on ethnic identity politics and conflict. In particular, this research will provide evidence to support or refute the implementation and development of civil society and crosscutting institutional arrangements for the prevention and reduction of ethnic strife in multi-ethnic societies. This research study is thus important because it examines the extent to which, and under what conditions, shared water resources represent an opportunity and strategy for cooperation and conflict prevention in multi-ethnic areas such as the Ferghana Valley.

Stinky Peace: Bringing Sustainable Income and Energy Source to Kabul

David Hee Lee, Fall/Winter 2008

Project Summary

David Lee conducted a project entitled Stinky Peace: Bringing Sustainable Income and Energy Sources to Kabul Afghanistan between 12/10/07 and 1/4/08.

Working with Afghans4Tomorrow and Engineers without Borders, David further developed the "The Briquettes project" which not only helped clean up the streets of Kabul, but also promoted a healthier environment in local communities. It provided accessible fuel for Kabul's citizens and provided jobs for those who were marginalized by the Taliban. Through his project David helped the people of Afghanistan and educated people in the U.S. about the culture of Afghanistan.

Ethnographic Study to Develop Sustainable Access to Clean Drinking Water

Laura E. Olsen, Spring/Summer 2008

Project Summary

This was an ethnographic study to develop sustainable access to clean drinking water in the Dominican Republic between 5/12/08 and 6/12/08.

As a member of the Student Organization for Medical Outreach & Sustainability (SOMOS), Laura Olsen independently designed and conducted ethnographic research to understand the causes of local healthcare issues and to develop a knowledge of community needs. She conducted field interviews with members of the "Paraiso Segundo" community to confirm that rain-water harvesting could be a viable strategy and that local residents would participate in such a project. She also conducted field interviews with residents outside Paraiso Segundo to ensure that the water project would not produce unintended consequences. In addition, Laura identified local partners for possible participation in future sustainable water projects.

Designing for Airborne Diseases in India

Marika Shioiri-Clark, Spring/Summer 2008

Project Summary

Marika Shioiri-Clark's project focused on combating airborne diseases through building design in India from 7/1/08 – 8/15/08.

She researched the role of architecture in public health by studying the impact architecture has on the transmission rates of Tuberculosis and other airborne diseases in hospitals. Based on her findings she proposed building designs that would foster health human development and save lives. She studies and designed passive ventilation systems for resource constrained settings. In addition she developed an educational infrastructure that connected the Harvard Graduate School of Design to resource constrained settings like India.

Human Traffic's Rush Hour: A Study of the Human Trafficking Industry in Phnom Penh, Cambodia

Thao Nguyen, Summer 2009

My project focused on human trafficking efforts in Phnom Penh, Cambodia, where I ended up working for The Asia Foundation's Counter-Trafficking in Persons team. Here, I was able to provide analytical assistance in evaluating the test pilots for educational campaigns implemented on the grassroots level. Moreover, the work that summer placed an emphasis on fully incorporating women into the Cambodian economy as a means of developing the country. The opportunity was great in that it provided me with an opportunity to analyze policy efforts and implementation from the grassroots level all the way up to the governmental level, including the Cambodian Ministry of Women's Affairs and the Ministry of the Interior. This experience brought together my interests in counter-trafficking, gender issues, immigration, and national security.

This interest in transnational issues in Southeast Asia and my desire to serve has led me to pursue my Master's in Public Policy at Harvard's Kennedy School of Government this fall where I will focus on International Trade and Finance. Following my graduate studies, I will enter the U.S. Foreign Service, where I will hopefully be able to work on global women's issues.

Prevention of Childhood Diseases through Hand Washing with Soap in Ghana: A Participatory Approach

Stan Wang, Summer 2009

Background: Each year, more than 4 million children die from diarrheal diseases and acute respiratory infections. In Ghana alone, ~84,000 children under five die of diarrhea each year, representing a quarter of all child deaths. Studies have shown that handwashing with soap (HWWS) can reduce diarrheal diseases and acute respiratory infections by 70%. Unfortunately, less than 5% of Ghanaian mothers wash hands with soap.

Methods: Phase I consisted of consulting with stakeholders to develop a plan to increase HWWS behavior, obtaining commitments from stakeholders and participatory program development. In phase II, the intervention phase, adult peer educators (APEs) used behavior change communication (BCC) to promote HWWS at two critical points: before eating and after defecation. The target audience was mothers of children under age 5 years and schoolchildren.

Results: Ninety percent of mothers of children under age five years (n=327) in the community participated in half-day HWWS behavior change activities. Each of five schools in the community entered into a commitment to improve HWWS, and received requested materials including soap, basins and towels. Additionally, APEs engaged 1,639 schoolchildren in BCC activities.

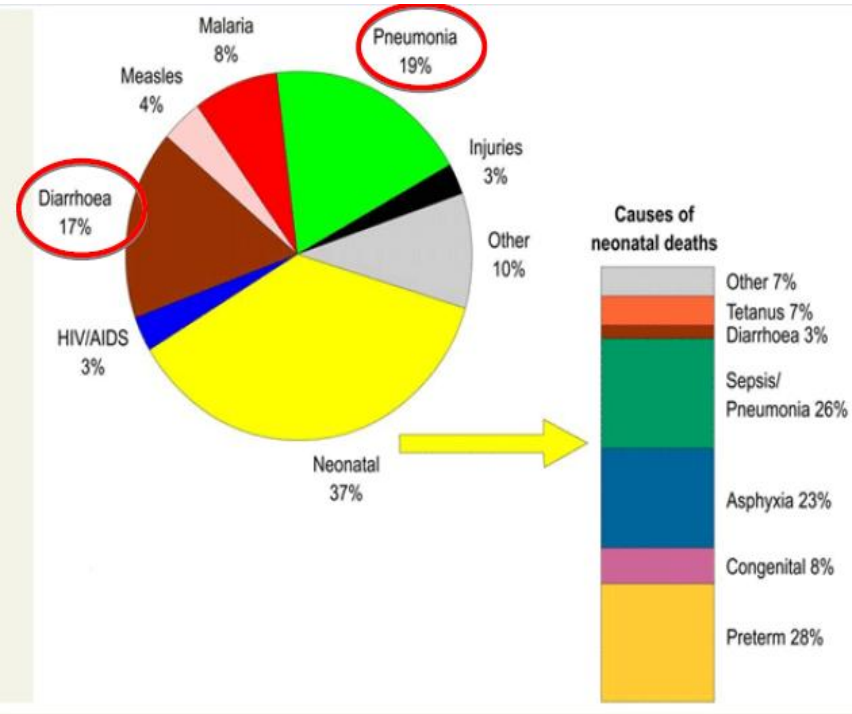
Conclusion: Our program demonstrates the feasibility of participatory program development and implementation of an intensive HWWS behavior change program. The high level of community engagement and excellent participation rates suggest acceptability. Future monitoring and evaluation will further delineate the sustainability and impact of this program on HWWS behavior and diarrheal disease prevalence in the community.

Ghana Health and Education Initiative (GHEI)

- Run locally by Ghanaians with 7 full time staff and 11 part time staff; support team in US/UK
- Programs include: malaria prevention, HIV prevention, nutrition, after school academic and leadership program, early childhood education, library, computer center, scholarships

Source: Bryce J. et al., Lancet, 2005

Causes of Under-Five Child Mortality:



Hand Washing with Soap (HWWS) is powerful but rarely practiced:

- Reduces diarrheal diseases and acute respiratory infections by 70%
- < 5% of Ghanaian mothers participate in HWWS

Source: Curtis & Cairncross, 2003

GHEI pilot program: context

- Rural village ~4,000
- Water obtained from wells and boreholes
- Fewer than half with access to a latrine
- Soap used during bathing
- Rinse hands after eating

Use of soap in handwashing

Incentives
- Nurture
- Disgust
- Social Concerns

Disincentives
- Accessibility
- Availability
- Lack of awareness

Source: Scott et al., 2007

GHEI pilot program targets and approach

- Mothers of children under five
- Schoolchildren
- Community investment/ownership of intervention

Process Indicators

- Mothers reached: 295 / 327
- Schoolchildren
    - 4 primary schools
    - 1 junior high school
    - 100 basins
    - 200 towels
    - 100 bars of soaps

Short-term Follow-up & Evaluation

- Global Handwashing Day
- October follow-up
    - Mothers of children under five
    - Schoolchildren/Schools
        - "Running" water solution?

Long-term

- Expansion to other GHEI locations
- HWWS + de-worming + bednets
- Children
    - Reduction in disease
    - Less truancy in school
- District-level advocacy

Thank You

Please visit us at www.ghei.org

Stan Wang

Swang1@neoucom.edu

Technology Granted Freedom

Colton M. Kennedy, Fall 2010

Project Summary

The Technology Granted Freedom project focused on the development and implementation of Appropriate Rural Technologies (ART) in rural India. Specifically, the goal of the project was to develop a networking infrastructure between students and professionals. The project successfully attained this goal and went further so as to directly empower the local population. As a result of the project, water filtration technologies were newly introduced into areas of inner Maharashtra, and Information Education and Communication (IEC) materials relative to these technologies were developed and distributed in areas of Haryana and Maharashtra. Additionally, the project has the potential to initiate a collaborative effort between students in the United States and England on the development of biogas producing bioreactors in Maharashtra, a technology which has the potential to provide both an economical and sustainable energy source for low income areas.

The total in-country duration of the project was just under five weeks, from December 10th, 2010 to January 12th, 2011. Of this time, three weeks were spent near Delhi working with the Institute for Rural Research and Development (IRRAD) at their Gurgaon research campus, and one week was spent in rural Haryana working at a satellite facility of IRRAD. Just less than one week was spent in rural Maharashtra working with the Appropriate Rural Technology Institute (ARTI) at their Rural Entrepreneurship Development Center in Phaltan.

While in northern India, my intent was to work with both USAID and with IRRAD regarding sustainable rural technologies. USAID had agreed to liaise with activities that USAID had in India related to sustainable rural technologies. This did not happen, however, as the contact I had made in USAID at the US Embassy in New Delhi transferred to another location and became unavailable. Although this was a disappointment, IRRAD provided significantly greater support to my efforts than had been anticipated, and I was still effectively able to carry on project activities.

As agreed upon prior to arrival, I assisted IRRAD with the development of IEC materials for IRRAD's implementation of bio-sand water filtration systems. This project proved a great opportunity for me to view the success and failures of previous rural technologies, as well as to gain an understanding of how these technologies fit within the larger scope of rural development and capacity building. While working with IRRAD, I conducted several single and multi-day

visits to Nagina and to the surrounding rural villages of Gaghas and Notki located in the Mewat District of Haryana. The Mewat District, and in particularly the villages where I was working, is highly impoverished, and heavily Muslim in comparison to surrounding areas. IRRAD provided me the opportunity to safely access these communities, and supported my activities by providing lodging, facilitating transportation, and arranging translators for my visits.

The visits made into the Mewat District allowed me to conduct interviews relative to the success of various technologies which had been incorporated into the daily lives of these citizens. The technologies which had been previously implemented in the area included solar powered street lighting, village water supply systems, and new cooking stove systems, among others. The interviews were held both with male heads of household, and with women. One particular meeting allowed me to meet with village elders and the village sarpunch to discuss the issues that had been encountered with IRRAD's implementation of bio-sand water filtration systems. My secondary major in Biological Systems Engineering proved extremely useful when engaging in these conversations. The content of the discourse allowed me to work with IRRAD in their development of IEC materials for these small rural populations.

On the fourth week I traveled from Delhi to Pune via plane and traveled inland to Phaltan via the state run bus service. Phaltan is home to ARTI's Rural Entrepreneurship Development Center. This center works to develop and transfer innovative and sustainable rural technologies to local communities. While in Phaltan, I was accommodated in the center's dormitory which is used by ARTI to lodge regional villagers who come to take part in ARTI's Entrepreneurship Development Courses. In the few days spent at the center, I met with key leaders of the organization. Particularly, I met extensively with the facility's Research Director, who was able to provide valuable information relative to the agricultural, energy, and water management related technologies ARTI had been developing and implementing in that area.

Coincidentally, ARTI was looking for new water filtration technologies to implement in that region of Maharashtra. This allowed me to share with them the experience and knowledge which I had previously gained in working with IRRAD on bio-sand water filtration systems. Specifically, I was able to provide design information, and contacts in a Canada based research effort focusing on developing these filters. I was also able to provide ARTI with solutions to some of the problems which IRRAD had encountered in implementing while implementing the systems in Haryana.

At the ARTI's Phaltan center I also learned of a project in which they are trying to develop a cost effective system to generate electricity with the use of bio-gas producing bioreactors. In the last few years, a team of students from a United Kingdom Engineers Without Borders chapter have worked with ARTI in the development of this technology. Several professors at Iowa State University conduct extensive research on bioreactor design, and ISU is highly respected in this

field. It is my belief that the development of a collaborative effort between the ISU EWB chapter and the UK EWB team focusing on this technology has the potential to strongly impact the success of this work. I am currently taking steps to establish this multi-national effort.

General Comments

I strongly feel that the ultimate goal of the project was successfully attained, however, it may be noted that certain aspects of the proposal are not mentioned in the project summary statement. Those are, the creation of a project website, and the formation of a non-profit organization.

A few months after receiving the fellowship award, I was contacted by members of the American Society of Mechanical Engineers (ASME), an organization to which I belong, regarding a new project they are developing to collaboratively engage engineers to make a positive impact the in the developing world through technology and engineering. The ASME project is known as Engineering for Change and can be found online at www.engineeringforchange.org. This is precisely what I had envisioned when developing my proposal for the LWB Traveling Fellowship. I have since worked with ASME to share some of the knowledge I gathered through my experiences in India. A feature article was published on the Technology Granted Freedom project earlier this year. It is my belief that working with this organization will allow my work to make a greater impact than if I were try to develop a parallel project.

Regarding project finances, the proposed budget was stated in the proposal to lie in the range of $4,000 to $5,000. The final expenditures for the project amounted to a mere $2,664. This amount included all transportation, accommodations, and personal travel vaccinations. The original budget was partially based on the expenses incurred by a friend who had previously traveled in India for Business. Traveling alone, and being as “adventurous” as I am, I was able to realize additional savings from that which had been accounted for in the original estimate. Additionally, no fees were paid for website development and hosting.

Personal Outlook

When friends ask about my experience in India, the only thing I can say is that it is “inexplicable”. That single word answer seems to be about the only way I am able to describe it to someone who has not been there for themselves. The Laura W. Bush Traveling Fellowship was incredibly beneficial, and I am extremely thankful for haven been granted the opportunity to pursue these endeavors. I believe that my efforts positively contributed to a growing movement which will improve the human condition of all peoples.

During the summer of 2011 I will be working for Pegasus-Global Holdings Inc., an engineering consulting firm which focuses on Project Management of major infrastructure projects. I

previously interned with this company in the summer of 2010. This summer I will be working on one of the world's cleanest, most efficient, and most advanced coal power plants.

At this time I have only to complete my senior year before receiving my Bachelor's Degree in Mechanical Engineering. In the next few years I plan on pursuing a Master's degree, potentially focusing on the development of new solutions to America's growing energy demand.

NOTE: The included photos are ordered chronologically from December 8th to January 12th.

The 10hr layover in London on the way to Delhi provided ample time to see a bit of The city for my first time.

Upon arrive IRRAD took me on a tour of Dehli before work began.

This is the IRRAD community center located in Gaghas, Haryana. In the photo are various technologies which IRRAD has been working to implement in the area, including solar lighting, bio-sand water filtration, and a weather monitoring station.

A picture of the countryside taken while riding on the back of a motorcycle. This became my standard mode of transportation in rural areas.

Another picture of the Haryana countryside. Notice the pile dung clods in the foreground which are a primary source of cooking fuel. The bent stalks of wheat in the background provide shade for squash and vegetables.

Here is a nursery system being implemented by IRRAD in Haryana.

Here my interpreter is explaining the correct use of the bio-sand filtration system to a woman. The woman had previously had difficulties in maintaining the system.

This is the new well being dug for the Notki elementary school. This well is being dug by traditional means, and will provide a new clean and cool source of water for the children.

Here I am being given a tour of the Notki school. I was able to meet with the head teacher to discuss what information was being taught regarding microorganisms and bacteriological water contamination.

Above is the new hospital which has been built by IRRAD for the people of Notki and the surrounding villages.

A woman prepares chai using a traditional stove. This was customary at all the homes I visited, and is evidence of the genuine hospitality shown by the Indian people.

Behind these children is the new fuel briquetting machine located at the IRRAD Gaghas community center. The machine converts low density fuel sources into higher density pellets which may be used for cooking.

The above school boys had plenty of questions for the first ‘gora’ they had seen. I was happy to entertain them.

The man to the right of me, and the man on the far right of the photo are American university students that I ran into while in-country.

This state run bus served not only as an economic, but also as an adventurous, mode of transportation between Pune and Phaltan.

This thin mattress bed was a welcome sight after the bus ride into Phaltan. This is ARTI's dormitory where I resided while in Phaltan

Here I am standing with the Research Director of ARTI's Phaltan Entrepreneur-ship Development Center.

Above is an early morning photo of the ARTI compound.

Pictured here are several types of cooking stoves which ARTI teaches local entrepreneurs to build and sell.

Above is a local flour mill in Phaltan where I was able to obtain some bacteriologically 'safe' form of sustenance. I was told that the motor which these millers used to power their grinders was American built and had "never needed any repair." The men were very proud of this.

The day prior to my departure from India I took a brief jaunt to Agra by train to see the Taj Mahal.

Water and Health in Limpopo

Maintaining Water Health Education in Primary Schools

Melina Schoppa, Fall 2010

The WHIL Project

The Water and Health in Limpopo Project is a partnership between the University of Virginia and the University of Venda that has been in place since 2008. Together, we work on a variety of initiatives aiming to improve access to clean water in the rural villages of Tshapasha and Tshibvumo, located in the Venda region of the Limpopo Province. These initiatives include building a slow-sand water filter to increase the supply and cleanliness of water, and community engagement projects aimed at generating goodwill within the communities.

In Summer 2010, a team of University of Virginia students, including me, and University of Venda students pioneered a "Clean Water Camp" designed to teach healthy water practices to primary school students ages 6-13. Including education in the WHIL project was a new concept, but our team believed that youth education was a sustainable and cost-effective way to promote healthy changes in the community's usage of water.

In March 2011, I returned to South Africa using the funding from the Laura Bush Traveling Fellowship program to expand on the curriculum and obtain feedback from the community on what they would like to see included in future lessons.

Objectives

- Conduct a pre-assessment to determine basic knowledge about water health and assess retention from the Summer 2010 Clean Water Camp.
- Conduct focus groups with parents and community members to obtain feedback about the WHIL project as a whole and recommendations about what to include in the expanded Clean Water Curriculum.
- Generate goodwill for the WHIL project by continuing to engage community and meet their needs.

Obstacles

- Funding

My return trip was initially scheduled for December 2010, but I was unable to find enough additional funding to make this possible. I traveled with a graduate student from the University of Virginia, so we had to wait for additional funds to become available from our school so we could finance the trip and the necessary materials. In addition to the Laura Bush Fellowship, I received two grants from the University to fund the trip. We postponed our trip until March 2011, and ended up spending slightly over two weeks in South Africa.

- Time Constraints

Because of the limited amount of time we had in the communities, we were not able to teach many new lessons during the March visit. We were able to meet with the students for three lessons, which primarily gave us time to conduct a pre-assessment and review material from Summer 2010. We obtained information about what new information to include in the curriculum during the focus groups, which could not be scheduled until the second half of our trip. That said, during our lessons with the students we focused on leadership-building activities that focused on problem-solving and teamwork.

Outcomes

- Pre-Assessment

One main goal of the March trip was to collect quantitative data that could tell us how much information the students retained from the Clean Water Camp of 2010. In order to achieve this, we used a simple assessment in which students were asked to respond to eleven yes-or-no questions regarding water and health. Each student had a sign with "Yes" on one side and "No" on the other and held up their chosen answer in response to each question. We worked in two primary schools, Tshapasha Primary School in Tshapasha (n=25) and Mboneni Primary School in Tshibvumo (n=21).

Here is the assessment:

1) Do you think water is a problem in the community?
2) Do you already use clean water practices?
3) Should you wash your hands before you eat?
4) Who has learned about water health before?
5) If water is clear, is it okay to drink it?
6) Who thinks the water they drink is clean?
7) Is wasting water a problem in the community?

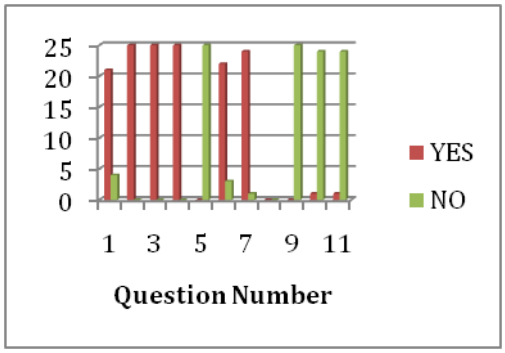
Do you agree with the following statements:

8) Conserving water means using as much water as you need so there will be enough for everyone.
9) Disposing of chemical and trash in the water makes water unsafe to drink.
10) Getting water from upstream is better than getting water from downstream.

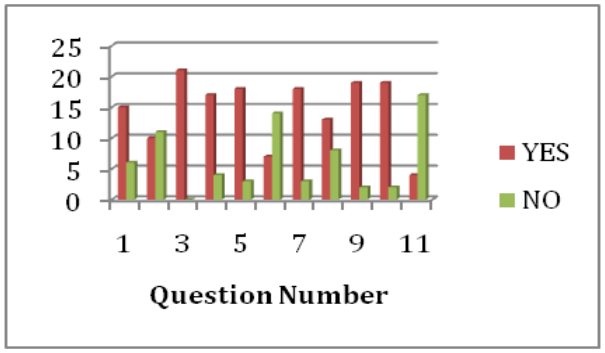
11) If you get water from upstream you can drink it without filtering or cleaning

Here are the results from the assessment:

Tshapasha Primary School



Mboneni Primary School



We believe the great disparity between the two schools in terms of level of retention is due to the difference in English fluency at each school. The responses from Tshapasha are much more uniform than those from Tshibvumo, theoretically suggesting that the Tshapasha students retained the information better. However, in Tshapasha, the assessment was almost conducted in its entirety in TshiVenda, the local language of the region, because many of the students were not fluent in English. This could explain the high level of uniformity in the responses. At Mboneni School, the teacher who was present during the assessment insisted that we use English. This was common, since the teachers at the schools saw us as a resource that could help the students improve their English skills. However, conducting the assessment in English could have led to some confusion in the class about the meaning of the questions, leading to the less uniform pattern observed.

We believe that the retention rate from June 2010 was fairly high. However, due to the presence of students in the class who were not present at the Clean Water Camp in June, the data reflects slightly less overall retention. However, it is equally important to note that that these students do not yet understand all of these concepts, as the focus of our program in not just the Clean Water Camp students, but also the student body in general. Although most of the Clean Water Camp students did seem to remember what we had taught in Summer 2010, the fact that other students did not yet know this information signals that we can do a better job of ensuring that this information is transmitted throughout the schools and the community at large.

- Focus Groups

We conducted two focus groups, one in Tshapasha (17 participants) and one in Tshibvumo (27 participants). Participants included parents, community leaders, and other interested community

members. In both groups, we asked about perceptions of the WHIL project as a whole, and then spent most of the session specifically discussing the water and health curriculum.

Feedback about the curriculum was overwhelmingly positive. Parents reported seeing changes in their children's behavior following the Clean Water Camp in Summer 2010. For example, one mother mentioned that her son began to wash his hands more frequently following the Camp. Several participants expressed the view that one of the most important goals of the curriculum should be that it is conducted in English. Parents cited a less than 50% graduation rate from the local secondary school as evidence that students could really benefit from English practice, and insisted that in the future all of our lessons be conducted in English. Nation-wide examinations for children, administered by the South African government, are in English, so students must be able to read and write in the language fluently to pass Grade 12.

Several parents in both communities also stressed that our lessons should focus on sustainable solutions to the water problem, such as water conservation. They also expressed support for the lessons geared towards leadership and problem-solving skills, since they saw our presence in the communities as a possible motivating factor to get their children to pursue higher education.

Community members expressed complaints about the slow-sand water filter that is being constructed by engineering students at UVA and UNIVEN. We assembled a report of these concerns and met with faculty at UVA concerning these issues upon returning to UVA.

Reflection

I felt that our team was able to complete most of our objectives despite the limited time. Working in an area with little access to modern technology, things move a lot slower than they do in urban areas. Often, our team had to wait several hours to make copies or print a document, and sometimes wait several days to schedule a meeting. I think I was able to expedite this process a lot because I had worked in the community previously and knew many of the key figures in the community. For instance, we were able to set up meetings with the schools before we got to South Africa, saving a lot of time. We were also able to avoid a long formal consultation with the village chiefs before beginning work because we had worked on the same project previously.

Defining and adhering to goals is another challenge of projects like this one. Our project targets the water problem in these communities. However, many community members see other problems in the communities as well and want us to help address them. We were asked if we could help provide science equipment for the schools and buy chairs and desks. I want to help as much as possible, and it was difficult to say "no" when there is a genuine need for these items. I had to avoid over-committing and making promises that our team could not keep. We tried to solve this dilemma by compromising as much as possible with the community—we believe addressing their needs is crucial to our project's success. In this vein we agreed to stress English fluency more in our lessons, since this was one of the major concerns that we heard from parents and teachers alike.

Future Work

Another team of students will be returning to these communities in June 2011. Our work in March primarily served to set the stage for their longer visit, and provided this team with information so that they can restructure and expand on the curriculum from Summer 2010. I am working closely with the students who will be traveling this summer to develop a work plan that fits the needs of the community.

Integrated Geology: Clean Water for Tushile, Kosovo
Jonathan Yates, Summer 2011

Background:

Kosovo is the youngest and also one of the poorest countries in Europe. High levels of unemployment and slow economic development have hindered people from developing their water sources in a healthy, sustainable way. In addition to these barriers, cultural norms also tend to create among Albanians in Kosovo an attitude of complacency towards acting to change the status quo, even if it would be beneficial to them to do so. This has created situations in rural villages where nearly all household wells are contaminated with bacteria from human and animal waste. In houses at higher elevations that are further from the water table, wells often go dry in the summer. Also, waste disposal practices have seriously affected the country's streams and rivers by filling them with both sewage and non-degradable trash.

Project Summary:

This summer project was done in cooperation with Wheaton College and Water For Life (WFL), two organizations that have partnered with each other since 2008, when a project was initiated in Kosovo. WFL is a nongovernmental community development organization aiming to bring safe and adequate water supplies to people throughout the world, but it is currently involved working in Tushile, a rural village in Kosovo's poorest region.

As mentioned above, the water taken from Tushile's household wells has all been tested and has shown varying degrees of contamination by bacteria. While the human body can adapt to water-borne bacteria to some extent, it is still a very dangerous situation. The presence of bacteria from fecal waste indicates that wells are open to surface contamination, and if more

deadly strains of bacteria were to enter the community, like the bacteria that causes cholera, it would spread through the village quickly and probably cause many deaths.

The most appropriate solution that WFL and Wheaton College devised, both for cost and sustainability reasons, was to continue using the preexisting wells to provide water but to seal them off from surface contamination through "well rehabilitation." This requires the construction of a 2 meter concrete pad around the well and the insertion of a ring-well with a lid over the top of the well opening. A pump and pipeline would be buried in the ground from the well directing water to a storage tank in the house. This pump and storage tank would make it possible for families to access their water source without putting it into contact with sources of contamination (i.e. lowering dirty buckets into the well). The tank, while increasing project costs, is essential in ensuring the continued success of the project, since power outages occur on a daily basis in Kosovo, and a full tank would allow gravity fed water to be used in the house even when the power is off. Wells would remain sealed but be periodically shocked with bleach to kill any resident bacteria.

The beginning of my time in Kosovo was spent conducting a survey of the village to evaluate which households wanted WFL's help with their water and were willing to meet WFL's requirements. To encourage ownership of the project and make it sustainable, households were asked to pay 10% of the costs, provide the physical labor (WFL workers would also work), and help their neighbors with rehabilitating their wells.

After the survey was conducted, work began rehabilitating household wells. Before my time ended in Kosovo, 12 families had received help from WFL in rehabilitating their wells and getting running water within their houses. By the end of the summer, 30 wells being used by 35 different families were rehabilitated. WFL now has Arben Hoti, a permanent staff member and

native Albanian resident of Kosovo, living just a few kilometers away in the city of Skenderaj, who will be involved in Tushile, monitoring the success of these projects. He will be working to continue to maintain a relationship between WFL and the village while also monitoring the usage and maintenance of the wells. Any necessary repairs can be made by the plumber in the village who WFL worked with while rehabilitating the wells. Villagers will be responsible for maintaining their own wells, but for at least the next two years Mr. Hoti will continue to encourage and educate them on the importance of this upkeep.

Mutual Learning through Partnership:

Not only did this project make progress towards achieving the UN development goal of providing a safe water supply for people throughout the world, I believe it was also especially effective in fostering a global partnership between the Albanians living in Kosovo and citizens of the United States. We worked directly with the families who would be affected by our rehabilitation projects, often sharing tea or coffee in people's homes as we talked and learned about each other's lives. People often offered to find me an Albanian wife. From them, I learned what genuine hospitality looks like. I also learned about the history of conflict between the Albanians and the Serbs in Kosovo, which not only includes the years of war and ethnic conflict, but also the long process of rebuilding, forgiving, and reconciling.

It was especially memorable to take two boys, living in an apartment below my own, to Kosovo's North Mitrovica, a city still contested at being a part of Serbia and run by a parallel government. When we drove across the Ibar river into North Mitrovica, my Albanian friend Ilir sunk into his seat, obviously afraid, saying, "I am in Serbia." The tensions between Albanians

and Serbs do still exist. These problems are not unsolvable, but they are much more complex than I ever would have thought as an external observer of the conflict.

Albanians in Kosovo love Americans and I believe my presence helped to change the nature of that relationship from a distant one to one with close friendship ties. It's noteworthy that on Kosovo's Independence Day, American flags are almost as common as the national Albanian flags. Another indicator of their love for Americans is a statue of Bill Clinton overlooking a large street named after him in the capital of Pristina. "Please come into my house," people would say," Because you have helped my people and my family, I want to help you however I can." Ironically, I've found that most of my peers in the United States have never heard of Kosovo. It is a privilege to be able to raise the awareness of my friends and family about this tiny niche of the Balkans that our country has helped form, a place that I know by more than its name and its history, but more by the faces and voices of the friends I got to know while I was there.

Recycling Research:

One of the components of my proposal when I applied for the Laura W. Bush Travelling fellowship was that I would work with WFL to organize a community cleanup of the *Klina*, the stream running through both the city of Skenderaj, and also the village of Tushile. We decided not to proceed, however, because any results from that cleanup would likely be short-lived. Oxfam, another NGO, organized a stream cleanup several years ago, one that incorporated education about solid waste disposal to try and change the situation in this region of Kosovo. It brought no lasting change and the stream banks are once again covered in trash. Currently, only

urban areas in the city of Skenderaj have garbage collection services, while the outlying villages have no existing system of garbage collection.

Since a stream cleanup would not lead to lasting change in the cleanliness of the stream, I set out to find out if there was any way to make better solid waste disposal practices a reality in Tushile. This research led me to many different places, including the offices of several municipal officials, different cities, and even different countries in the region. Through my traveling and the interviews I conducted I learned a lot about solid waste disposal in Kosovo. The objective of the research was to find a way to make Kosovo cleaner while also creating jobs (unemployment is above 40%). In this way better waste management practices would be self sustaining because people would do them independent of any government programs or laws, which have failed to make a real difference, since dumping trash into community streams is already outlawed.

Through meeting with the municipal director of waste management, Shemsi Maksuti, I learned that the private company that collects garbage in the city only collects garbage from around 10% of the municipal population and it is being subsidized by the government. It is barely operational because of trouble enforcing payment by families and businesses using communal dumpsters. Although most people use the dumpsters, many insist that they don't and refuse to pay the company. This problem has persisted for some time and Uniteti, the garbage company, is now owed nearly 200,000 Euros from families and businesses in the area. The garbage that is collected, without being sorted or compacted, is trucked to an open dump about a half an hour away, where it is left to do untold environmental damage to the local population, ecosystems, and groundwater.

Recycling was found to be the best method and most practical first step for both Skenderaj and Tushile. No recycling program exists in the city of Skenderaj or any of the

surrounding villages. Through my research, however, I learned of entrepreneurs in other places of Kosovo who had established recycling businesses that were profiting from the recycling of paper products and PET plastics. If one of these businesses could be initiated in Skenderaj, not only would the amount of waste going into the streams and the dump be reduced, but more jobs would be created. Furthermore, a business like this wouldn't require any government assistance, like the garbage disposal company.

The primary obstacle preventing recycling in Skenderaj and Tushile is the capital investment required to make it profitable. The owner of a recycling collection center in Ferizaj, another city in Kosovo, made it very clear that it would not be worth his time to collect Skenderaj's recyclables unless they were crushed and bailed first. Machines to do this cost several thousand euros each. Sources of funding for this type of business are being pursued which will hopefully result in a good step towards more sustainable development in Skenderaj. An interested local has already been found who wants to do the work; he just needs access to the money that would enable him to start his business. There would still be many problems relating to waste disposal that must be dealt with, but a recycling program in the area would certainly reduce the damage that is done to the environment until Kosovo becomes more capable of tackling this issue in coming years.

As a follow-up for this research project, I made and presented a poster at Wheaton, and also traveled to Minneapolis for the Geological Society of America Annual Meeting where I gave a fifteen minute presentation entitled "Local Geology as Guide to Development Projects in Kosova." The GSA provided me opportunities to dialogue directly with others in the field of Geology that are engaged with community development projects throughout the world. It was

also a good chance raise their awareness of community development needs in Kosovo and the work WFL has done with Wheaton College in Kosovo.

Concluding Remarks:

It was both a pleasure and a privilege to represent the United States and help pursue UNESCO's goals through working in Kosovo. Not only were the original goals met, but there were unforeseen beneficial results as well. I have a much deeper understanding of the lives of people in Kosovo just as my friends there have a much deeper understanding of me and of my life. Also, I have gained an invaluable experience that will help guide my career path as I try to find ways to integrate what I have learned in the classroom with practical initiatives to help people in the developing world live better lives. None of this would have been possible without the support of the Laura W. Bush Traveling Fellowship and its donors. Thank you.

This is most of Tushile as seen from a nearby hill. Residents say that there are around 800 people living in the village, but they often count those who only live there for one or two months of the year. More realistic estimates put the population at about 600.

Here I am with some of my friends from Tushile who hiked up the hill with me to see their village from the top.

One of WFL's many well rehabilitation projects this summer. Each house had different needs. This particular well had no ring or pad around it; it was simply covered by some boards before we began. The picture on the left was taken shortly after the project began (I am the third from the left). The picture on the right shows the completed well rehabilitation project, minus a cover.

These are a bunch of the local boys who agreed to take a picture with me. They were interested in knowing what we were doing with water testing instruments in their streams.

This was one of the highlight of my time in Kosovo. Our downstairs neighbor was a taxi driver who could speak English so we often went down to his house after work to hang out and drink coffee. On one of our days off from work, he gave us a personal tour of part of Kosovo, taking us to the beautiful Rugova Valley. By the end of the summer, I felt comfortable in his house as if we had been family friends for years. Pictured here is me (on the right) with all of my friends family in Rugova.

This is the Klina being tested by a WFL intern, the stream that runs through Skenderaj and then flows through Tushile downstream. Notice the trash lining the stream bank and the algal bloom due to the nutrients dumped into the stream in the form of raw sewage.

This is the open dump used by Skenderaj and the nearby cities of Vustrii and Mitrovica. A closer look would reveal a large amount of recyclable garbage. Nothing is done to protect the environment or the nearby residents except for pipes allowing methane to escape without risk of explosions. The author is on the right.

Pictured here are bails of cardboard awaiting shipment to recycling plants in neighboring countries. The company that runs this operation is IDEA Recycling, located in Ferizaj, Kosovo. I also visited a recycling collection plant in Skopje, Macedonia to better understand the existing recycling network in the region.

GPI Action Project

Chitejé de Garabato, Querétaro, México & La Vaquita, Zacatecas, México

Introduction

In the summer of 2011, Sivakami Sambasivam led a team of MIT students to implement projects in Chitejé de Garabato, Querétaro and La Vaquita, Zacatecas. Chitejé de Garabato has worked in the past with several other organizations, including the Peace Corps and NGOs including CIASPE and Viviendas Rurales Sustenables, and has demonstrated a very strong internal initiative to adopt new technologies and ideas. Over the course of the summer, Sivakami's team of four students worked to build a relationship with the community and to develop several projects, focusing on the construction of greenhouses that would allow the growing season to be extended.

Budget

Current Funding Sources	Amount (USD)
Laura W. Bush Traveling Fellowship	2000
Tau Beta Pi Fellowshop	5000
Legatum Center	25000
Individual Contributors	500
Paul Gray (Matching Investment)	10,000
Community monetary investment	714.29
Total	**20714.29**

Pending Funding Sources (Guaranteed)	Amount (USD)
Pinos Government	2100
Zacatecas Government	2100
Total	**4200**

Possible Future Funding	Amount (USD)
Queretaro Government	15000 potential fellowship
Amealco Government	matching January 2012 funds
Tau Beta Pi	up to 1500 for IAP trips
Legatum Center	up to 2500 for IAP trips
Professor Gray	amount matched depending on future circumstances
Public Service Center	potential fellowship
Eloranta Fellowship	potential fellowship
Millenium Campus Network Fellowship	potential fellowship

Greenhouses

The first greenhouse was built at the house of Doña Sofia, a leader in the community whose family also helped with the construction. Due to knowledge gained as a result of this first greenhouse as well as from two greenhouses built in La Vaquita, some alterations were made to the design. Additional supports, thicker steel, and updated support placements were made to increase the stability of the greenhouse. Welding was also chosen in place of screws when possible. Of 45 households who initially requested a greenhouse, enough support was available for only fourteen, including twelve large-sized and two medium-sized greenhouses. Families were selected based on their gauged interest, need, and probable success as well as the team's desire to get a wide sampling of families across the community. Families who had never previously received aid were included in addition to families who had been very successful in past government technological support. After notifying the selected families, a two-day workshop was conducted, during which the second greenhouse (a large model) was built. A

similar workshop was held later for the smaller greenhouse models. For the final designs, the total cost for the large model was $4890 ($395 USD) and the total cost for the medium model was $2450 ($200 USD). The team spent a total of $70,000 ($5650 USD) ordering greenhouse materials for the rest of the greenhouses, which were delivered to a communal building. Families came to receive materials and signed promises that they would

1. Attempt to finish construction by the day of our departure;
2. Attend all future workshops on sustainable gardening practices given by the agricultural engineer Gabriela Lucas of the Centro de Innovación de Agricultura Sostenible en Pequeña Escala (CIASPE); and
3. Take care of their greenhouses, plant seeds they received, and care for their plants after our departure.

On the day of our departure, three of the greenhouses had been completely finished, and eleven were in some stage of construction, ranging from having completed the cement foundation with the steel poles for the PVC pipes to having finished with everything except for laying the plastic on top.

Biodigester

The project included implementation of a total of 3 small-scale family-owned biodigesters. The technology is a novel one for this community, and consists of a plastic tube in which anaerobic processes convert animal excrement and water into high-impact organic fertilizer as well as natural gas for cooking. Both of these outputs have the capacity to benefit multiple facets of the community: the fertilizer produced can be used instead of the expensive and environmentally harmful chemical fertilizers, while the natural gas saves each family the money that they would spend on firewood as well as prevents respiratory illnesses that come from burning firewood. There was a great deal of community interest in this technology, but before larger-scale dissemination the team decided to educate the community about the technology itself, including the construction, maintenance, and benefits. During this pilot, one biodigestor was constructed within the community itself out of a large tarp bag bought in the city of Querétaro, while the other was purchased from the company Sistema Biobolsa. We had bought materials for a third biodigestor (a different design), but ran out of time to construct it, so we left the materials with one man experienced in construction who was interested in building it.

Biodigestor Savings

	Money spent on wood per month	Money spent on gas per month	Total heating $ per month
Current energy $	$ 100,00	$ 210,00	$ 310,00
With biodigestor	$ 50,00	$ 0,00	$ 50,00
$ Savings	$ 50,00	$ 210,00	$ 260,00

1st model: Pays for itself in about 8 months

2nd model: Pays for itself in about 2 years

Small Business

In both of the communities we visited, there is little money generated within the community. Due to very limited access from La Vaquita to neighboring cities, subsistence farming is practiced. In Chitejé de Garabato, improved access to metropolitan areas allows men to travel to

the cities for construction work; however, the employment is unstable. As a result, poverty remains an issue in the community because parents rarely have enough resources to send children to high school. The GPI Team encountered community interest in beginning a small business to generate income, allowing women to pay for necessities and small luxuries such as vegetables and schooling for their children.

Over the course of the three trips to La Vaquita, the previous community, the GPI Team worked with women to design products and manufacture samples for demonstration to vendors. After beginning, the team found it necessary to provide the interested women and men with production and business lessons; thus, we partnered with a civil association to begin business workshops in the community. We are currently working with 34 women and 11 men in La Vaquita and have identified three areas of focus for products: *artesanías* (artisanal crafts like embroidery and bags), carpentry (tiles and bricks), and food products (fruits and vegetables).

Future

During the semester, we will be involved in following up on the greenhouses by telephone. We are also interested in having groups travel to Garabato to check up on families with greenhouses and biodigestors and provide assistance as well as collect data to evaluate the efficacy and impact of the technologies.

GPI plans to continue sending students to Chitejé de Garabato area for the next five years. The next on-site work period with MIT students will occur in January 2012, and GPI plans to send six students to continue the current projects. At least two students from the summer 2011 group, Stephanie Lin and Melissa Kornspan, will return as part of the January 2012 team. We would love to include some students from the University of Querétaro in Amealco (UAQ) on our team, as well as some master's students from MIT.

During the next visit, the team would like to focus on bringing in outside experts to teach community members proper methods of plant cultivation with greenhouses (continuing of what Gaby and CIASPE will have been doing during the months between now and then). We also plan to conduct an evaluation of the greenhouses built this past summer with respect to aspects such as degree of usage, type of plants cultivated, crop yield, state of greenhouse structure, and impact on familial eating habits. Based on our findings, the current greenhouses will be redesigned and the construction manual updated. We then plan to build a pilot of the new model, purchase materials for twenty more greenhouses, and distribute the new manual and materials to new families. Families that have regularly attended Gabriela Lucas's workshops will have priority in the selection, which has been made known to the community. In January 2012, we also plan to evaluate the state of the three biodigesters implemented in Chitejé de Garabato. If the cheaper versions built by GPI and the community are still functional, we will take steps to expand the design to other community members. If they are not functional, we will redesign them if possible; otherwise we will investigate the installation of additional Sistema Biobolsa biodigester models, potentially with the support of microfinance organizations.

During following visits to the area, GPI would like to disseminate projects to nearby communities including Chitejé de la Cruz and El Varal. During summer 2011, our team visited Chitejé de la Cruz and met with community leaders and representatives of the Department of Sustainable Development (SEDESU) with experience in sustainable initiatives there. We would also like to work with SEDESU to identify other potential municipalities for future projects.

Timeline

<table>
<tr><th>September</th><th>October</th><th>November</th><th>December</th><th>January 2012</th><th>February-June</th><th>Summer 2012</th></tr>
<tr><td colspan="7">Work with various groups to do follow-up and evaluation of newly built greenhouses in Garabato as well as some control families</td></tr>
<tr><td colspan="7">Arrange for some community members to attend capacitaciones related to greenhouse growing</td></tr>
<tr><td colspan="4">Continue to contact people with knowledge of greenhouses for help in tweaking design and with capacitating community</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>IAP Trip: Focus on building relationships with community, incorporating more social activities</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>Conduct greenhouse evaluation and assessment; redesign greenhouse, construct pilot greenhouse of the new model, purchase and distribute materials and manuals for construction of twenty additional greenhouses</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>Evaluate state of the two different biodigesters, update and/or expand one of the models to additional community members</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td colspan="2">Follow up / assessment of new greenhouses</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>Dissemination of project to Chitéje de la Cruz and possibly El Varal</td></tr>
</table>

Greenhouse Construction

Chitejé de Garabato team constructing the model greenhouse

Don Miguel welding the door

Team standing before finished model greenhouse

The finished model greenhouse

One of 14 greenhouses constructed in Garabato (window is unfinished)

Another greenhouse (window also unfinished)

Biodigester

Above: Digging trench for biodigester

Below: Completed biodigester startup

Left: Completed installation of Sistema Biobolsa biodigester

Below: View of end where excrement-water mixture is placed